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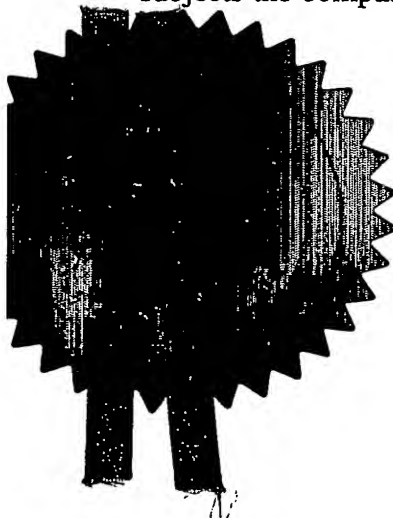
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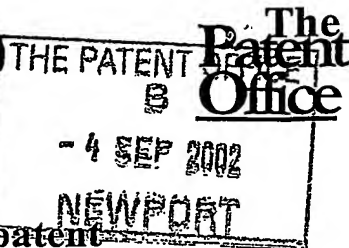
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3.	Full name, address and postcode of the or of each applicant (underline all surnames)	Bernar (International) Limited 27 Anson Road Martlesham Heath Ipswich IP5 3RG United Kingdom 08458705001 Patents ADP number (if you know it) If the applicant is a corporate body, give the country/state of its incorporation		
4.	Title of the invention	Method and apparatus for preserving the contents of beverage containers		
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Description 11

Claim(s) 4

Abstract 1

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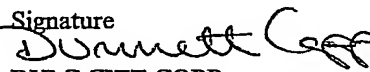
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12. Name and daytime telephone number of person to contact in the United Kingdom
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DUPLICATE

METHOD AND APPARATUS FOR PRESERVING THE CONTENTS OF
BEVERAGE CONTAINERS

This invention relates to preservation of the contents of
5 beverage containers, in particular to preserving the
contents of still and sparkling wine bottles once some of
the wine has been removed. However, the invention can
equally well be used with other beverages and other type
of containers, for example wine barrels.

10

It is known to preserve still wine in wine bottles by
evacuating the air space above the liquid once some of the
wine has been consumed. It is also known to preserve
sparkling wine in wine bottles by pumping air or carbon
15 dioxide into the bottle to prevent the wine from losing
its sparkle.

However, a problem with such known systems is that the
residual air (and hence oxygen) in the bottle allows some
20 oxidation of the contents to occur. Furthermore, some
beverages may deteriorate if kept at a sub atmospheric
pressure for a sufficient length of time.

This invention seeks to reduce the amount of residual
25 oxygen in a beverage container in order to increase the
length of time for which a preserved beverage may be
stored, and seeks to avoid the need to store a beverage at
a sub atmospheric pressure.

30 In its broadest aspect, the invention provides apparatus

for preserving the contents of a part filled container,
the apparatus comprising a stopper with a bi-directional
valve, adapted to be removably fitted in an aperture of
the container; means for extracting a gas from the
5 container, through the valve in the stopper; and means for
introducing a gas into the container, through the valve in
the stopper.

The invention also provides an apparatus for preserving
10 the contents of a part filled container, the apparatus
comprising a bi-directional valved stopper, adapted to be
removably fitted in an aperture of the container; a vacuum
source communicating with a socket of the apparatus via a
first pneumatic circuit, the socket being adapted to form
15 a seal with the stopper, the vacuum source being arranged,
in operation, to remove gas from the container via the
stopper to create a sub atmospheric pressure inside the
container; means for disconnecting the vacuum source once
a first predetermined pressure has been achieved inside
20 the container; an inert gas source communicating with the
socket via a second pneumatic circuit, the inert gas
source being arranged to supply inert gas into the
container via the stopper once the vacuum source has been
disconnected; and means for ceasing the supply of inert
25 gas once a second predetermined pressure has been achieved
inside the container.

The vacuum source is preferably a vacuum pump, and the
means for disconnecting the vacuum source comprises a
30 switch which switches off and stops operation of the pump.

By replacing air, and its oxygen content with an inert gas in a part filled container it is possible to slow the rate of oxidation and hence deterioration of the contents. As
5 the percentage of oxygen in air is known (approximately 18%) and the percentage of remaining air/gas at the first predetermined pressure is known, it is possible to quantify the residual oxygen content after a cycle of removal of gas followed by supply of the inert gas. Two or
10 more cycles may be completed in order to further dilute the residual oxygen content and therefore further increase the possible period of preservation. Alternatively the level of vacuum (ie the first predetermined pressure) may be increased with the same result.

15 In the preferred embodiment of the invention the bi-directional valved stopper is a stopper incorporating a flutter valve. The flutter valve is preferably arranged, once a cycle is complete, to retain a small residual
20 pressure differential between the atmosphere inside the container and the ambient atmosphere outside.

In the case of still beverages, the pressure inside the bottle will be slightly superatmospheric, so that the
25 slight residual pressure prevents the ingress of air if the container (for example a bottle) is cooled or refrigerated. In other embodiments the stopper could incorporate two non return valves which operate to prevent flow in different directions, for example.

30

For the preservation of sparkling beverages it is desirable to apply a ~~superatmospheric-pressure to the part~~ filled container in order to prevent the beverage from losing its sparkle. This can be done after replacing air and its oxygen content with an inert gas, thus ensuring that the beverage neither oxidises nor loses its effervescence.

Therefore, for preservation of sparkling beverages the apparatus further comprises a second gas source communicating with a socket, the second gas source being arranged, in operation, to supply gas into the container via the stopper; and means for ceasing the supply of the gas once a third predetermined pressure is reached.

It would be possible for the two operations, i.e. the replacement of residual oxygen by an inert gas, and the application of a head pressure to be carried out via the same socket. However, for ease of use by bar staff, in the preferred embodiment there are two sockets one for the replacement of residual oxygen by an inert gas, and a second for the application of a head pressure from a second gas source.

Before offering a sparkling beverage container to the socket for application of the head pressure it is preferable if a second stopper (designed to fit snugly over the first stopper) is fitted. The second stopper has a retention device to stop it from being blown apart from the first stopper, and a non return valve to allow the

head pressure to be applied and retained.

Argon is a preferred inert gas, because argon is particularly effective for inhibiting the evaporation of any dissolved oxygen present in a liquid in the part filled container. Carbon dioxide is preferred as the gas for creating the head pressure. It would also be possible to use carbon dioxide as the inert gas so that only a single gas supply is required.

10

Preferably, the means for stopping the pump from pumping through the valve is also arranged to activate the supply of inert gas. The means for stopping the pump from pumping through the valve and for ceasing the supply of the inert gas or the head pressure gas are conveniently implemented by the use of pressure sensitive switches located in the appropriate pneumatic circuit, and arranged to operate once the appropriate sub atmospheric or super atmospheric pressure is reached.

20

Such switches may be arranged to actually stop the pump or supply or they may be arranged to close a valve in the appropriate pneumatic circuit, or both.

25

Part of the or each socket can be spring loaded relative to a switch which starts the pump operation or the supply of the second gas so that the socket can be displaced by offering the container to the socket, causing the switch to operate.

30

According to a second aspect of the invention there is
also provided a method ~~for the preservation of the~~
contents of a part filled beverage container, comprising
the steps of removing gas from the container until a first
5 predetermined pressure is achieved; and supplying an inert
gas to the container until a second predetermined pressure
is achieved.

The above steps may be performed a number of times in
10 order to repeatedly dilute the amount of residual oxygen
remaining in the part filled beverage container.

This method may be used for the preservation of sparkling
beverages by including the further step of supplying a gas
15 under pressure to the container until a third
predetermined pressure is reached.

According to another aspect of the invention, there is
provided a stopper for a wine bottle, the stopper having a
20 skirt to seal against the neck of a wine bottle and a bi-
directional valve which can open to allow flow through the
stopper in either direction when a pressure differential
above a threshold level is applied in either direction
across the stopper, and which remains closed when a
25 pressure differential below said threshold is applied.

The bi-directional valve is preferably a flutter valve and
the stopper is preferably a one-piece moulded product of
an elastomer material, with the lips of the flutter valve
30 being integral with the stopper.

The invention is particularly intended for and adapted to the preservation of wine contained in conventional glass bottles, and may be installed behind a bar where a selection of wines is available for sale. It is simple for a bar tender to dispense one glassful from a part-consumed bottle, to insert the stopper and offer the bottle up to the apparatus so that the air in the headspace, and its oxygen content, can be evacuated from the bottle.

10

Stoppers may be used which are colour coded to indicate the ideal frequency for the replacement of residual oxygen by an inert gas to be performed, in dependence upon the expected turnover of the particular product. For example, black may indicate a fast moving product which requires the operation to be performed once at the end of service. Silver may indicate a product which requires the operation to be performed once after each glass of wine is served, and gold may be used to indicate a product which requires the operation to be performed twice after each glass of wine is served.

20

Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings in which

25

Figure 1 illustrates an apparatus according to the present invention;

30

Figure 2 illustrates a stopper for use in the present

invention; and

Figure 3 illustrates a retaining device for use with the present invention.

5 Figure 1 illustrates a schematic view of one embodiment of the present invention. The apparatus is set to a ready condition using a switch 17. A wine bottle 2, from which a glass of wine has been dispensed, is closed with a
10 reusable bi-directionally valved stopper 1 which is inserted into the mouth of the bottle 2. The bottle and stopper are then offered up to a socket 3. The socket is connected to a strike plate 5 for operating a switch 4. The strike plate 5 is biased such that a switch 4 is
15 usually in the off position. Upward pressure on the strike plate 5 triggers the switch 4, which causes a vacuum pump 6 to operate and an amber neon bulb 7 to be illuminated. The vacuum pump 6 serves to withdraw air from the headspace of the part filled bottle 2 through the
20 stopper 1 via a first pneumatic circuit.

The stopper 1 incorporates a flutter valve (see Figure 2). This valve will retain a small pressure differential between its two sides (eg 0.1 - 0.15 bar), irrespective of
25 which side is at a higher pressure and which side is at a lower pressure. The valve will however open to allow flow from one side to the other when a pressure differential above a certain level is applied across the valve.

30 A pressure sensor 8 is arranged to detect a first

predetermined pressure, which is a subatmospheric pressure. Once this first predetermined pressure is achieved and detected by the sensor 8 a solenoid valve 10 is caused to operate to close the first pneumatic circuit.

5 Relays 11a, 11b, 11c serve to turn off the pump 6 and to open a second solenoid valve 12 in a second pneumatic circuit. Argon is supplied from a remote source 13 (not shown) via the socket 3 and the stopper 1. In this embodiment of the invention argon is pumped through the

10 second pneumatic circuit, although it would be possible to allow the argon to be drawn through the circuit by the pressure differential which has been created.

A second pressure sensor 16 is arranged to detect when a

15 second predetermined pressure has been achieved. This second predetermined pressure is just above atmospheric pressure, for example 1.1 to 1.2 bar. Once the second predetermined pressure is achieved the relays 11a, 11b, 11c serve to close the solenoid valve 12, which closes the

20 second pneumatic circuit and cuts off the supply of argon. The amber neon bulb 7 then goes out and a green neon bulb 15 lights up to indicate operation complete.

In the event that the supply of argon is exhausted the

25 second pressure sensor 16 does not operate and the green neon bulb 15 does not light up. The operator will then know that the operation has not been properly completed.

Removing the bottle 2 causes the switch 4 to return to the

30 off position. The green neon bulb 15 goes out and the

apparatus is reset and ready for the next operation.

When the stopper is removed to allow more of the container contents to be dispensed, there will be a small rush of gas out of the container.

The flutter valve 31 (Figure 2) is preferably arranged to open inwardly at pressures of 1 ± 0.15 bar and outwardly at ≤ 1 bar.

10

Figure 3 illustrates a second stopper 32 which is adapted to fit snugly over the bi-directionally valved stopper 3. The second stopper 32 has a non return valve 33 and a retaining clip 34 which is designed to engage under the neck 35 of a bottle 2.

15

This stopper is to be used in a second operation to be carried out for the preservation of sparkling wines, which will now be described with reference once more to Figure 1.

20

The stopper 32 is secured over the bi-directionally valved stopper 3. The bottle and stopper are offered up to a second socket 20, which utilises a strike plate 21 and a switch 22 in a similar manner to that described previously.

25

Activating the switch 22 causes the relays 11a, 11b, 11c, to open a solenoid valve 23 allowing carbon dioxide to be supplied via the socket 20 and the stoppers 3, 32. The

30

amber neon bulb 7 lights up. Carbon dioxide is supplied from a remote source 24 (not shown) and is pumped into the bottle 2, via a third pneumatic circuit until a third pressure sensor 25 detects that a third predetermined
5 pressure has been achieved.

Once the third predetermined pressure is achieved the relays 11a, 11b, 11c, serve to close the solenoid valve 23, closing the third pneumatic circuit and cutting of the
10 supply of carbon dioxide. The amber neon bulb 7 goes out and the green neon bulb 15 lights up.

Similarly to the previous case, in the event that the supply of carbon dioxide is exhausted the pressure sensor
15 25 does not operate and the green neon bulb 15 does not light up.

Removing the bottle 2 causes the switch 22 to return to the off position. The green neon bulb 15 goes out and the
20 apparatus is reset.

CLAIMS

-
1. Apparatus for preserving the contents of a part filled container, the apparatus comprising
- 5 a stopper with a bi-directional valve, adapted to be removably fitted in an aperture of the container;
- means for extracting a gas from the container, through the valve in the stopper; and
- means for introducing a gas into the container,
- 10 through the valve in the stopper.
2. Apparatus for preserving the contents of a part filled container, the apparatus comprising
- a bi-directional valved stopper, adapted to be
- 15 removably fitted in an aperture of the container;
- a vacuum source communicating with a socket of the apparatus via a first pneumatic circuit, the socket being adapted to form a seal with the stopper, the vacuum source being arranged, in operation, to remove gas from the
- 20 container via the stopper to create a sub atmospheric pressure inside the container;
- means for disconnecting the vacuum source once a first predetermined pressure has been achieved inside the container;
- 25 an inert gas source communicating with the socket via a second pneumatic circuit, the inert gas source being arranged to supply inert gas into the container via the stopper once the vacuum source has been disconnected; and
- means for ceasing the supply of inert gas once a
- 30 second predetermined pressure has been achieved inside the

container.

3. Apparatus as claimed in Claim 2, wherein the vacuum
source is a vacuum pump, and the means for disconnecting
5 the vacuum source comprises a switch which switches off
and stops operation of the pump.

4. Apparatus according to Claim 2 or Claim 3, in which
the bi-directional valved stopper is a stopper
10 incorporating a flutter valve.

5. Apparatus according to any one of Claims 2 to 4,
further comprising

a second gas source communicating with a socket, the
15 second gas source being arranged, in operation, to supply
a second gas into the container via the stopper; and

means for ceasing the supply of the second gas once a
third predetermined pressure is reached.

20 6. Apparatus according to Claim 5, further comprising a
second stopper adapted to fit over the bi-directional
valved stopper, the second stopper having a non return
valve and a retention device.

25 7. Apparatus according to any one of Claims 2 to 6, in
which the inert gas is argon.

8. Apparatus according to any one of Claims 2 to 7, in
which the means for stopping the pump is arranged to
30 activate the supply of inert gas.

9. ~~Apparatus according to any one of Claims 2 to 8,~~
further comprising a switch biased in the off position by
a spring which is in communication with a socket and in
5 which the socket can be displaced against the action of
the spring by introduction of the container having the
stopper fitted in an aperture, and wherein the
displacement of the socket operates the switch to start
the pump pumping through the valve.

10

10. Apparatus according to any one of Claims 2 to 9,
further comprising a switch biased in the off position by
a spring which is in communication with a socket and in
which the socket can be displaced against the action of
15 the spring by introduction of the container having the
stopper fitted in an aperture, and wherein the
displacement of the socket operates the switch to start
the supply of the second gas.

20 11. A method for the preservation of the contents of a
part filled beverage container, comprising the steps of
removing gas from the container until a first
predetermined pressure is achieved; and
supplying an inert gas to the container until a
25 second predetermined pressure is achieved.

12. A method according to Claim 11, further comprising
the step of supplying a second gas to the container until
a third predetermined pressure is reached.

30

13. A stopper for a wine bottle, the stopper having a skirt to seal against the neck of a wine bottle and a bi-directional valve which can open to allow flow through the stopper in either direction when a pressure differential above a threshold level is applied in either direction across the stopper, and which remains closed when a pressure differential below said threshold is applied.
14. A stopper as claimed in Claim 13, wherein the bi-directional valve is a flutter valve.
15. An apparatus substantially as herein described, with reference to the accompanying drawings.
16. A method substantially as herein described, with reference to the accompanying drawings.

ABSTRACT

METHOD AND APPARATUS FOR PRESERVING THE CONTENTS OF
BEVERAGE CONTAINERS

5

This invention provides a method of and an apparatus for
preservation of the contents of a part filled beverage
container, such as an opened wine bottle. The method
comprises the steps of removing gas from the container
10 until a first predetermined pressure is achieved; and
supplying an inert gas to the container until a second
predetermined pressure is achieved. To preserve the
contents of a sparkling wine bottle, it is possible to
supply a pressurising gas to the container until a third
15 predetermined pressure is reached.

Figure 1

1/2

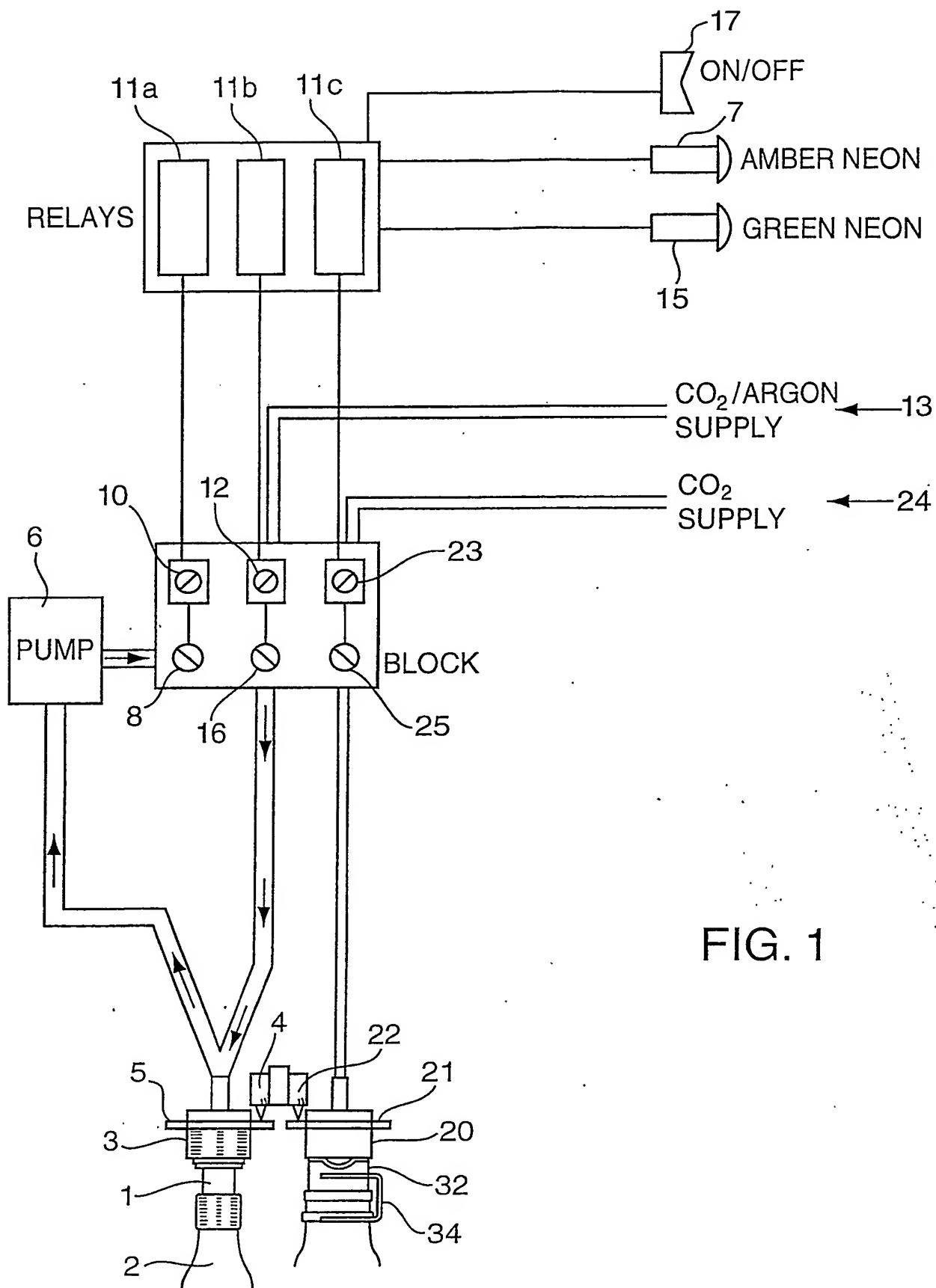
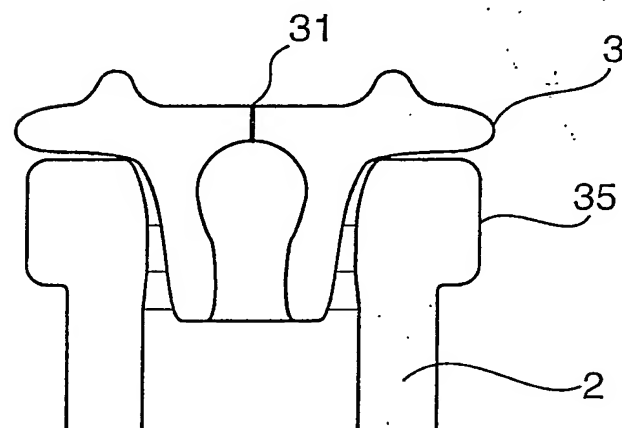
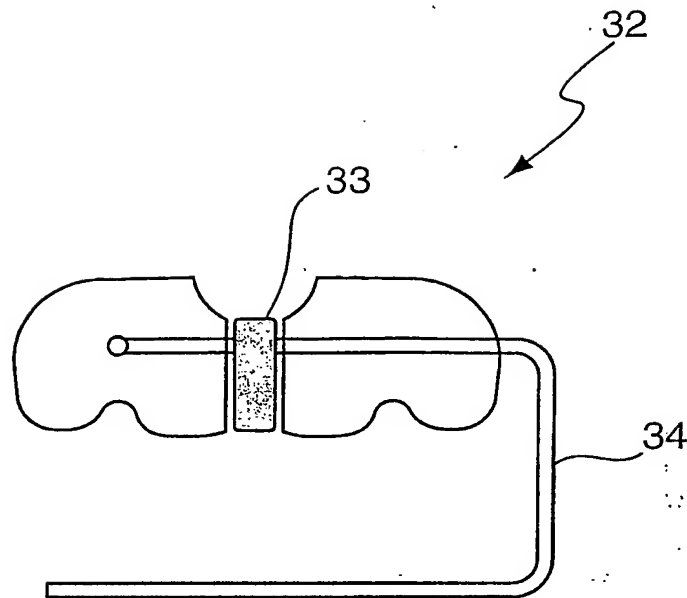


FIG. 1



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